

**Productive Tasks**:

1. Calculate daily water usage of your home/school
2. Finding out water resources in your village
3. Test if the water you consume is drinkable
4. Treating water
5. Keeping water body clean

**Concept**:

In this lesson you will learn the importance of water conservation and grey water treatment, the process of grey water treatment.

**Class-Age Group**: 14 & above

*Open Education Resource*

*Environmental Services*

 -Grey Water Treatment

**Introduction**

**Greywater**, also spelled **gray water,** is considered wastewater by most people. However, it’s beginning to be treated and used as fresh water around the world in places dealing with growing populations but shrinking amounts of fresh water. Greywater is the used water from showers, baths, hand washing, laundry, and dishes. It does not include sewage water, like water from toilets, which is called **blackwater**.

Greywater is **non potable**, which means it is unsafe to drink. It can contain many harmful things, like chemicals from soap, shampoo and dish liquids, to food particles, bacteria, and whatever dirt or germs you wash from your hands and body. In most households, the water that fills our toilets is unnecessarily **potable** (drinkable) water, and many communities are considering recycling greywater to flush toilets.

Sir, So many times I have been reading in the newspaper that , in India we have to face drought problem every year. Why can’t we do something to conserve the water???

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Keshav, I am impressed!!! This is a positive way of thinking. Everyone should contribute to conserve water. I have few good ideas to utilize grey water....

But sir ... I have no idea about this greywater????

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Ohhh.... Do not worry. Let us first learn basics of grey water... then I will give you few productive tasks so that you will learn while doing those activities.

Wow... I am really excited. Thanks!!!

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![C:\Users\Mandar\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\Z9BW6DE0\MC900371050[1].wmf]()**Learning Resources:**

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| Sr. No. | Power Point Presentations |
| 1 | grey waterday1-.pptx |
| 2 | grey waterday2 .pptx |

Before doing the productive task 1, go through the above learning resources.

**Productive Task 1: Calculate daily water usage of your home/school.**

Have you ever thought about daily water usage at your home?

**Collect daily water usage of your home in the following manner and also calculate the daily water usage per person in your family.**



**Productive Task 2: Finding out water resources in your village**

1. Where all does the water in your village/school come from? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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2. Are they surface sources of water or underground sources of water?

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3. Where are these water sources located?

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4. How is water transported from there to your home?

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5. Who is in charge of the village water - Supply, Maintenance etc.?

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6. Talk to the older people of your village and discuss with them the water situation when they were young. Has anything changed since then? How? Why?

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**Productive Task 3: Test if the water you consume is drinkable**

Use the **H2O strip test** to determine, whether the water you consume is drinkable or not.

Use below learning resource to know the procedure for performing this test.

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| Sr. No. | Power Point Presentations |
| 1 | Water testing.pptx |

**Productive Task 4: Treating water**

In this productive task you will learn the different processes that take place during the water treatment. Let us learn each by doing it yourself.

**Materials required:**

* 5 Litres of “Dirty water”

(Collect a sample from a local water source, or add 2 1/2 cups of dirt or mud to 5 Litres of water)

* 1 plastic bottle with its cap
* 2 plastic bottles, with their tops cut off
* 1 large container
* 2 tablespoons of alum (potassium aluminium sulphate)
* 1 $\frac{1}{2}$ cups fine sand (beach sand) (Thoroughly cleaned)
* 1 $\frac{1}{2}$cups coarse sand (Thoroughly cleaned)
* 1 cup gravel (Thoroughly cleaned)
* 1 cup of crushed charcoal (Thoroughly washed and dried in the sun)
* 1 piece of clean cloth
* 1 rubber band
* 1 tablespoon (for the alum)
* 1 large spoon (for stirring)

**Now you need to do is... you have to follow the steps below:**

**Step 1:** Pass the “Dirty Water” around. Describe the appearance and smell of the water.

**Step 2: Learning aeration**

Aeration allows gases trapped in the water to escape and adds oxygen to the water.

At the end of this process, the gases have escaped (bubbles should be gone). Once you are done, describe the appearance and odour of the water.

**Procedure:**

1. Place the cap on the bottle and shake the bottle vigorously for 30 seconds.
2. Continue the aeration process by pouring the water back and forth between the two cut-off bottles 10 times.

 **Step 3: Learning Coagulation**

Coagulation is the process by which dirt and other suspended solid particles chemically “stick together” into clumps of alum and sediment, so they can easily be removed from water.



**Procedure:**

1. Add two tablespoons of alum to the aerated water from step2
2. Slowly stir the mixture for 5 minutes. You will see particles in the water clinging together to make larger clumps.

**Step 4: Learning Sedimentation**

Water can be left for a period of time to allow heavier impurities to settle. This process is called sedimentation. The water on top is then poured out carefully.

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**Procedure:**

1. Allow the water from Step 3 keep it undisturbed in the cylinder.
2. Observe the water at 5 minute intervals for a total of 20 minutes. Write down what you see. What is the appearance of the water now?

**Step 5: Learning Filtration**

Filtration is a process by which the water passes through filters that help remove small particles from it. Charcoal is effective in removing some tastes, odours, and colour. Ordinary charcoal available locally could be used.

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**Procedure:**

1. Cut off the bottom of the bottle.
2. Turn the bottle upside down and pour in the charcoal, gravel, coarse sand, and finally the fine sand.
3. Put the bottle spout into a tall glass or some container that can hold your filter upright.
4. Carefully - without disturbing the sediment - pour some of the dirty water from Ex 4 through the filter slowly.
5. Watch the water seep through the sand and gravel.
6. Compare the treated and untreated water. Has the treatment changed the appearance and smell of the water?

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| Sr. No. | Power Point Presentations |
| 1 | grey waterday3.pptx |

**Productive Task 5: Keeping the water body clean**

Is there any water body near your school/village? It could be small pond, river...etc. Take a close look at it and try to find out answers for the following:

1. Is there anything unwanted floating on the surface? How dirty are the banks? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Do people dump garbage around the water? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Do they bathe or wash clothes there? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Do they bathe their pet animals there? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Do they wash trucks or tractors there? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Are there factories around the water? Where does waste from the factories go? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. Where does the sewage from the nearby houses go?

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Work out a plan on how you can clean a water body in your village.

Plan should be such that it should take care of keeping it clean for future as well.

**Additional video references:**

1. Video of Water filter presentation :

[**http://www.youtube.com/watch?v=ue0L4d\_AwtE**](http://www.youtube.com/watch?v=ue0L4d_AwtE)

1. **DIY: Cheapest & Easiest Removable Gray Water System :**

[**http://www.youtube.com/watch?v=UDYWrQsaNZY**](http://www.youtube.com/watch?v=UDYWrQsaNZY)